

Amendments to the Claims

This listing of the Claims will replace all prior versions and listings of the claims in this patent application.

Listing of the Claims

1-20. (canceled)

21. (currently amended) An interconnect ~~opening structure~~ comprising:

a semiconductor structure having a first dielectric layer and a lower interconnect in said first dielectric layer;

a passivation layer over said first dielectric layer and said lower interconnect;

a stack dielectric layer over said passivation layer; and

an upper interconnect ~~opening~~ through said stack dielectric layer and said passivation layer contacting said lower interconnect and having sidewalls consisting of an interface layer comprised of copper sulfide.

22. (currently amended) The interconnect of claim ~~20~~21, wherein said stack dielectric layer consists of one dielectric layer.

23. (currently amended) The interconnect of claim ~~20~~21, wherein said stack dielectric layer is comprised of a second dielectric layer and a third dielectric layer.

24. (currently amended) The interconnect of claim 2021, wherein a metal ~~is in the upper interconnect opening to form~~ an said upper interconnect.

25. (currently amended) The interconnect of claim 2223, wherein there is an etch stop layer between ~~the~~ the said second and third dielectric layers.

26. (currently amended) The interconnect of claim 2021, wherein a cap layer is on ~~the~~ the said stack dielectric layers.

27. (currently amended) The interconnect of claim 2021, wherein ~~the~~ the said lower interconnect is comprised of one or more conductors from a group containing copper, aluminum, aluminum alloy, tungsten, titanium, titanium nitride, tantalum nitride, and tungsten nitride.

28. (currently amended) The interconnect of claim 2021, wherein ~~the~~ the said lower interconnect is copper.

29. (currently amended) The interconnect of claim 2021, wherein the dielectric layers are one of the following:

- a. non-porous undoped silicon oxide,
- b. porous undoped silicon oxide,
- c. non-porous doped silicon oxide,
- d. porous doped silicon oxide,

- e. non-porous organic material, porous organic material,
- f. non-porous doped organic material,
- g. porous doped organic material,
- h. phosphosilicate glass, or
- i. SiO₂.

30. (currently amended) The interconnect of claim ~~20~~21, wherein ~~the~~the said passivation layer is one of the following:

- a. silicon nitride,
- b. silicon oxynitride,
- c. silicon carbide, or
- d. boron nitride.

31. (canceled)

32. (new) An interconnect structure comprising:

a semiconductor structure having a first dielectric layer and a lower interconnect in said first dielectric layer;

a passivation layer over said first dielectric layer and said lower interconnect;

a stack dielectric layer over said passivation layer; and

an upper interconnect through said stack dielectric layer and said passivation layer contacting said lower interconnect and having an interface layer comprised of copper sulfide only on sidewalls of said upper interconnect.

33. (new) The interconnect of claim 32, wherein said stack dielectric layer consists of one dielectric layer.

34. (new) The interconnect of claim 32, wherein said stack dielectric layer is comprised of a second dielectric layer and a third dielectric layer.

35. (new) The interconnect of claim 32, wherein a metal forms said upper interconnect.

36. (new) The interconnect of claim 34, wherein there is an etch stop layer between said second and third dielectric layers.

37. (new) The interconnect of claim 32, wherein a cap layer is on said stack dielectric layer.

38. (new) The interconnect of claim 32, wherein said lower interconnect is comprised of one or more conductors from a group containing copper, aluminum, aluminum alloy, tungsten, titanium, titanium nitride, tantalum nitride, and tungsten nitride.

39. (new) The interconnect of claim 32, wherein said lower interconnect is copper.

40. (new) The interconnect of claim 32, wherein the dielectric layers are one of the following:

a. non-porous undoped silicon oxide,

- b. porous undoped silicon oxide,
- c. non-porous doped silicon oxide,
- d. porous doped silicon oxide,
- e. non-porous organic material, porous organic material,
- f. non-porous doped organic material,
- g. porous doped organic material,
- h. phosphosilicate glass, or
- i. SiO₂.

41. (new) The interconnect of claim 32, wherein said passivation layer is one of the following:

- a. silicon nitride,
- b. silicon oxynitride,
- c. silicon carbide, or
- d. boron nitride.